

# VIRAL INDICATORS AND PATHOGENS

## Enteric viruses

- These human infectious agents are transmitted through the oral-fecal route.
- There are more than 100 different types of human waterborne viruses.

## Coliphage

- Coliphage are viruses that infect and replicate in coliform bacteria.
- Coliphage are found in high numbers in sewage.
- Coliphage are considered to be representative of the survival and transport of viruses in the environment.
- Two types of coliphage indicators are used:
  - Somatic coliphage infect the outer cell wall and are widely distributed in fecal-contaminated and uncontaminated waters.
  - F-specific coliphage infect the F-pili of male strains of coliforms, replicate at higher temperatures, and presumably come from warmblooded animals.

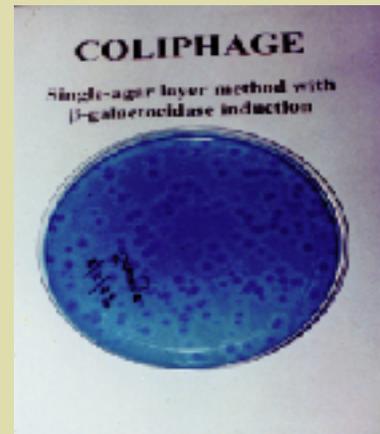
## Viral Methods

### COLIPHAGE (SOMATIC AND F-SPECIFIC) SINGLE-AGAR LAYER METHOD

- Simple and inexpensive, but needs to be done by a trained analyst under sterile conditions.
- Water sample added to molten agar that contains a coliform host, such as *E. coli*.
- Agar-*E. coli* mix is plated and incubated. If coliphage are present, *E. coli* cells will be infected and lysed, and a clear spot (a plaque) will be present in a lawn of cells.

### ENTERIC VIRUSES RT-PCR METHOD

- Enteric viruses detected using reverse-transcriptase polymerase chain reaction (RT-PCR).
- RT-PCR amplifies and detects the genetic material of viruses in water.
- Does not determine the infectious state of a virus; should be used in combination with cell-culture method.
- Detects enterovirus, hepatitis A, rotavirus, reovirus, and Norwalk virus.



↑ using RT-PCR



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← virus concentrated on filter